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ABSTRACT

Prepared for the 1971 National Science Teachers Association (NSTA) Annual Meeting, this collection of ideas, activities, and unit plans from the Mounds View Environmental Education Project would be useful for junior and senior high school teachers and curriculum planners. Content includes: (1) a senior high course outline and daily lesson plans for "Environmental Problems and the Future of Man," dealing with population explosion, food supply, natural resources, water and air pollution, and pesticides; (2) units for junior high environmental studies--soil conservation, animal poetry, pollution solution/communication, you as an environmentalist, and air pollution; (3) environmental activities particularly successful in the classroom; (4) a description of high school science courses relevant to the natural environment; (5) a junior high model for curriculum implementation; (6) suggestions on how the environmental education curriculum can be integrated with the social studies curriculum in the junior high school; (7) ideas for an interdisciplinary approach to the environmental education curriculum in grades 10-12; (8) various evaluation forms for faculty reaction, district assessment, and feedback; and (9) suggested proposals for environmental study sites. An interdisciplinary approach, primarily stressing science, social studies, and language arts is evident throughout the work. (BL)

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MOUNDS VIEW ENVIRONMENTAL EDUCATION PROJECT

REPORT # 1

Prepared For The
1971 N.S.T.A. Annual Meeting
Washington, D. C.

by

Duane Budde
Project Director
1970 2nd Place N.S.T.A. Ohauss Winner

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BACKGROUND ON PROJECT

Purpose

The purpose of the curriculum committee has been to produce an interdisciplinary guide that will inform students about their total environment. We must, as stated in the Report to the President and to the President's Council on Environmental Quality, "produce an informed citizenry, sensitive to environmental problems and prepared and motivated to work toward their solution."

The First Report to the Govenor and Legislature on Conservation Education by the Temporary State Commission on Youth Education in Conservation for New York State increases the scope of the problem.

> "To consider a person's relationship with his environment is to confront the fundamental social issues of our day. One cannot separate the problems of poverty, drugs, crime, and population from the problem of a decaying environment. For too many people, they are all part of the same cycle of misery and despair."

As an educator, I see that the youth I teach are concerned and do care. "Environmental Quality" is the big issue they must tackle. It is hopeful that they will be the generation that "cares enough" to solve our environmental problems.

I have included in this booklet a collection of items that I feel those interested in enviromental education or curriculum construction might find useful. Feel free to reproduce any of the items you are interested in using. I would appreciate any feedback you care to provide. We have a limited number of complete copies of the guide 7-12. They can be obtained at a cost of $15.00 - check made payable to Mounds View Independent School District 621. Mail request to:

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DAILY LESSON PLANS FOR ENVIRONMENTAL COURSE

7 day cycles --- quarter course

Introduction

Day one - Introduction to the course - reveal intentions of the instructors; hand out schedule for the quarter; describe requirements of the course which include worksheets, 3 week projects in each discipline represented and class activities; introduction of each instructor and the individual role that each will play in this interdisciplinary approach; hand out materials to be used (books, pamphlets, etc.).

Day two - Television presentation of CBS" National Environmental Test for students' self-check on prior knowledge and also an overview of the subjects to be covered in the course.

Population Explosion

Day one - Introduction to the first problem to be investigated - Population Explosion. The introduction will be handled in lecture form giving a general overview of all aspects of the problem.

The filmstrip "The People Problem" will be used to supplement lecture materials.

Reading assignment - Population Bomb, Chapter two - The Problem

Day two - Reading day. Students will meet in assigned small groups and get the unit reading assignments and worksheets. The readings for this unit will be taken primarily from Paul Ehrlich's Population Bomb.

Day Three - Day four - Day five - These three days will involve small group sessions and each of the three days the students will have a different instructor. The material in reference to each study area to be covered will be:

Science - Possible solutions to the overpopulation problem. Read chapters 3, 4, and 5 in the Population Bomb - Solutions. Showing of film "Population by the Billions."

Social Studies - Historical Background which will emphasize natural control and the problems ensued.

Communications - Two distinct styles of writing will be read and discussed as to their communication value on the subject: "Eco-Castastrophe" by Paul Ehrlich and "International Mortality Lottery" by William Dean.

Day six - Controversial speaker on population controls--Father Adrian, representative of the Catholic Church, speaking on birth control and abortion.

Day seven - Independent project study day. Individuals work on their projects.

Food Supply

Day one - Introduction to the next problem - Food Supply. Again the problem will be handled in a lecture form and the lecture will entail a general overview of the problem.

The filmstrip, "Population and Food", will be used to supplement the lecture.

Day two - Reading day. The readings and worksheets for this unit will be assigned. The readings again will be primarily taken from The Population Bomb by Paul Ehrlich.

Days three, four, and five - Small groups.

Science - Starvation and related diseases and suggested solutions.
Reading assignment - Chapters one and two of The Population Bomb.
Showing of the film, "Making the Desert Green".
Social Studies - Tape: "Hunger in America"
Communications - Discuss international political and social problems that can develop from this food supply problem. Assorted readings and historical situations will be cited.

Day six - Speaker from Planned Parenthood, to five other side of the controversy introduced by the speaker last week.

Also, this day is the end of the first project period. The projects will be handed in to specific project instructors.

Day seven - Independent project study day. The new project (Project II) will be assigned and the day may be spent in individual investigation with classroom materials, resource materials and library materials.

Natural Resources

Day one - Introduce the problem of Natural Resources. The introduction will be done by a lecturer aided by the use of transparencies.

Day two - Reading day. Worksheet and reading materials for this unit will be assigned on this day. Readings will be from the "Nat'l EQ" and "The Conservation Story", etc.

Day three, four and five - Small group discussion and activities.

Science - Emphasis in this area will be wildlife and the science instructor will take small groups to the Carlos Avery Game Refuge.
Social Science - Land abuse will be the emphasis here. Case studies from The Conservation Story will be used for resource materials as well as other assorted readings. Video tape on "The Vanishing Prairie" may be used.

Communications - A poem by Rod McKuen; and essay, "Now is the Time for all Good Men to Come to the Aid of Their Planet"; songs by Henry Gibson and other short selections will be used which emphasize destruction of aesthetic beauty of the land will be primary resources for discussion and reading activities.

Day six - Speaker - someone from The Conservation Department or The Fish and Game Department.

Day seven - Independent project study day.

Water Pollution

Day one - Introduction to the problem of water pollution. There will be a lecture overview supplemented by either a filmstrip from the "Environmental Pollution: Our World Crisis". Series or a film such as "The River Must Live", "The St. Croix River", or "Minnesota's Lakes and Streams". Transparencies will also be shown to identify the greatest water pollution trouble spots.

Day two - Reading day. Study guides and readings will be assigned. Some of the basic readings will be coming from Leinwand's.

Air and Water Pollution

Days three, four and five - Small groups

Science - The emphasis will be on a discussion and lab demonstrations showing causes and effects of water pollution. Subjects such as chloriform, bacteria, chemical pollutants, and sewage treatment will be discussed. Pages 26-39 in Air and Water Pollution will be the reading assignment.

Social Studies - The emphasis will be on water disasters and the filmstrip, "Man's Natural Environment", will be shown. Also selected readings on topics such as oil disasters, etc. will be used. Video-tape on "The Wild Rivers" may be shown also.

Communications - Movie by Eastman-Kodak, "Is There A Difference", feature for discussion here.

Day six - Field Trip to the Metropolitan Treatment Plant

Day seven - Independent study on projects and project II is due today.

Air Pollution

Day one - Introduction to the problem of Air Pollution. Transparencies will be used to show various ways of communicating the problems of pollution, (e.g. cartoons). Also a film or filmstrip such as "Air of Disaster" or "Let's Clear the Air" may be used.

Day two - Reading day. Reading and study guides will be assigned. Readings will primarily come from Leinwand's Air and Water Pollution.

Days three, four and five - Small groups

Science - The emphasis will be on discussing and Lab demonstrations showing the causes and effects, scientifically, of air pollution. Pages 14-29 of Air and Water Pollution will be the reading assignment.

Social Studies - The program will be developed around the filmstrip, "Summary Crisis Through Abuse".

Communications - Emphasis will be placed on the pictorial aspect of communications. Pictures from mass media productions will be used.

Day six - Field trip--Jonathon Paddleford Boat Trip up the Mississippi River.

Day seven - Independent study project day.

Pesticides

Day one - Introduction to the final unit of the course--Pesticides. A final overview of the problem will be covered in lecture form.

Day two - Readings and study guides will be assigned. Readings will be taken from Silent Spring by Rachel Carson.

Days three, four and five - Small groups

Science - Ecological effects of pesticides. Reading assignment will be chapters 1-12 of the Silent Spring.

Social Studies - Positive effects of pesticides. (Go into Green Revolution, etc.).

Communications - Use selections from Since Silent Spring to comment on Silent Spring and problems of communicating environmental problems to pupils.

Day six - Field trip--St. Croix River outing

Day seven - Third project due. Student Project Presentations. Here the students will present their projects and experiences in the course. Examples would include: a poem on pollution, an experiment with coliform bacteria tests on our local area, a short story relating to the future of man, a debate on a current environmental problem, etc.

Final Day - Student Project Presentations continued. Evaluations done.

SOIL CONSERVATION

I. Overview
   A. As mankind continues to increase its numbers, it must also increase its capacity to produce food. As most of man's food presently comes from the land it then becomes a necessity that the medium in which plants are grown be conserved and improved.

II. General Objectives or Purposes in Studying the Unit
   A. Understandings
      1. Five factors in soil formation.
      2. Purpose, composition and use of fertilizers.
      3. Leading effect of percolating water.
      4. Soil is composed of air, water, organic matter and minerals.
      5. Erosion brings about many serious problems.
      6. The organic matter in soils is the important water retaining agent.
      7. Through taxes we all pay for erosion and problems resulting from it.
      8. Most erosion can be prevented or greatly reduced.
   B. Attitudes
      1. Soil conservation is everyone's business.
      2. Soil is one of our most important natural resources.
      3. Many factors combine to form soil.
      4. Soil must be cared for in order to be productive.
      5. Food supplies are closely linked with soil productivity.

III. Outline of Content
   A. Description Outline of Unit
      1. Food situation in the world today.
         a. One half of the world's population is hungry or malnourished.
         b. The situation is worsening rather than getting better.
      2. Formation of soils.
         a. Five factors combine to form soils: parent material, time, climate, vegetation and topography.
         b. Glaciation also played an important part in the formation of Minnesota's soils.
      3. Experiment with plant foods and plant growth.
         a. The student may find that too much fertilizers are worse than none at all.
      4. Minerals for plant usage were present in the original rock from which the soil was formed.
         a. These minerals were made available to plants by the action of water, air, mild acids produced in the soil and gases.
      5. Composition and price rates ofr commercial lawn foods.
         a. There are many types of wawn foods available to the comsumer.
         b. They may vary greatly in their composition and price.
      6. Lowered soil productivity.
         a. Leaching dissolves minerals and carries them far beneath the ground where they are unavailable for plant utilization.
         b. Erosion is the physical removal of soils through the action of wind, moving water and moving ice.

7. Materials within soils.
   a. With the aid of sifting screens and a magnifier a student may identify many materials within a soil sample.
   b. The ideal soil composition is: 25% air, 25% moisture, 5% organic matter and 45% minerals.
8. The percentage composition of water in soils may easily be determined.
   a. The water content of soils depends upon many factors among which may be soil type, location and protective cover (shading).
9. Organic matter in soils
   a. Organic materials in soils are destroyed when subjected to burning.
10. Different materials may hold varying amonts of water.
11. The organic matter in soil is the important factor in water retention of soils.

HUNGER * POPULATION * POLLUTION FACT SHEET

One-half the world is hungry or malnourished.

Seven persons die each minute, 10,000 each day, 3 1/2 million each month, 40,000,000 each year.

An average dog in North America has a higher protein intake than an average child in India.

Human protein intake in North America is 66 grams a day; 8 grams in the Far East.

Two of every five adults in the world are illiterate.

40% of the population of the underdeveloped world is made up of people under 15 years old.

Undernourished infants may have 40% fewer brain cells than adequately nourished babies. This is significant in that the most critical period for the developing human brain appears to be from birth to six months of age.

Starvation often begins with a deficiency of just one food nutrient-protein. Although other nutrients such as starches, sugars, and fats may be available, protein deficiency alone will cause loss of appetite and severe diarrhea. The protein deficient person can barely bring himself to eat anything at all.

10 million Americans are chronically malnourished.

The food demands of the developing countries in 1985 will have risen by 140% in 23 years - largely because of population growth. If food production were to continue to increase at past rates by 1985 to fill the gap between their output and their needs, something which would clearly be impossible.

A "world population clock" - like the one the Census Bureau uses in Washington to deep track of U.S. population growth - would show that, on the average, 3.9 babies were born every second in 1969 while just under 1.7 people died. This amounted to a gain of 2.2 persons per second, 132 per minute, 190,000 per day, and over 1.3 million a week. The "clock" would have shown a world population of 3,551 billion on July 1, 1969, up 72 million over a year earlier. Forty years ago the world population was increasing by only about 20 million annually.

Currently, world population is growing at about 2 per cent a year, with regional growth rates ranging from less than 1 per cent for Europe to over 3 per cent for Latin America. The Data Sheet shows that population is doubling in 18 years in the world's fastest-growing countries - Costa Rica, and that it will take seven centuries for the slowest-growing countries - Luxembourg, Belgium and East Germany - to double their numbers. Costa Rica's birth rate is recorded as 45, her death rate as 7 (Births and deaths per 1,000 population per year). This means that there are over 6 births to every death in Costa Rica in contrast to the 2 to 1 ratio for the world as a whole. At its present rate of growth, Costa Rica's population of 1.7 million would expand in a century to nearly 75 million - 44 times the present total.

World population in 1650 was about 500 million. Two hundred years later, in 1850 it doubled to 1 billion. Eighty years later, in 1930, it doubled again in 2 billion. Present world population is about 3 1/2 billion. It will double to 7 billion aby the year 2000, less than 35 years from now. If growth continued at the present rate for the next 900 years, there would be 60,000,000,000,000,000 people - sixty million billion - 100 persons for each square yard of the earth's surface.

Each American baby will consume in a 70-year life span, directly or indirectly: 26 million gallons of water, 121 thousand gallons of gasoline, 10 thousand pounds of meat, and 28,000 pounds of milk and cream.

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American Freedom from Hunger Foundation
1717 H Street, N.W.
Washington, D. C. 20006

As can easily be seen by the previous figures, the necessity for food will not be diminished in the years to come. In order to maintain the already low food supply we must conserve and improve the medium in which the food is grown. Most of the existing food utilized today originates as the land, thus, the soil must be conserved.

FORMATION OF SOILS

The top few inches of soil provide the people of the world with most of their food supply. In spite of this fact, many people never look at soil carefully.

A quick glance at a handful of soil shows that it is a mixture of many things. Included are minerals, water, air, and biological substances such as roots, small animals, decaying matter, and microorganisms. Because of this variety of substances, biologists, chemists, geologists, and physicists have all added to our understanding of soils. Also, this variety of substances provides many things in the soil to interest the students who study it.

All soils are formed by the combined effects of five soil forming factors. They are as follows: A. Parent Materials, B. Time, C. Climate, D. Vegetation, E. Topography.

PARENT MATERIALS

All soils have as their origin the solid rock of the earth. This solid rock is called bedrock. As this solid rock has broken apart into smaller and small pieces it became part of the fractured rock layer.

TIME

With the passage of more time the fractured layer gradually disintegrates into yet smaller particles. This layer is called the subsoil.

CLIMATE

Climatic factors of temperature and precipitation govern to a large extent the rate at which the parent rock layers break apart. High and low temperatures together with an abundance of precipitation would cause the rocks to break apart faster than would mild temperatures with little changes accompanied by little rain or snow.

VEGETATION

Although the vegetation of a region depends on a large extent on the climatic conditions it still plays an important part in the soil type of the area. The plant remains such as leaves, needles, or branches decompose and add their characteristic properties to the forming soil.

TOPOGRAPHY

The topography of the land refers to the slope and surface characteristics. If the land were very hilly the soil formed could easily be carried away during a heavy rain storm. Water flowing down into rock layers tends to aid in the formation of soil. If the surface of the land is so hilly, water does not get a chance to flow into the soil but rather runs off the land.

Most of the parent material from which Minnesota soils are formed was deposited by the action of glaciers with samller amounts being deposited by wind and water. The glaciers moving over the state from north to south leveled hills and filled valleys, grinding the rocks to form soil parent material. In southeastern Minnesota and southwestern Minnesota soil parent materials were deposited by wind during and following the Ice Age. The materials from which soils are developed in the Red River Valley of western and northwestern Minnesota were deposited as sediment by glacial Lake Agassiz immediately following the Ice Age. Similar soils were developed by other glacial lakes in parts of Blue Earth, Aitkin, Carlton, and Southern St. Louis Counties.

The factors of climate, vegetation and topography operating since parent materials were deposited account for most of the different soil characteristics seen today. Most of the native vegetation of the entire state was that of prairie or forest. The soils developed under prairie vegetation are dark colored to a greater depth. This variation

in coloring is due to the organic matter added to the soil by the vegetation. The varying rainfall from one section of the state to another has been the greatest climate factor in the development of soil in Minnesota with temperature have a lesser effect. Topography, soil structure and vegetation largely govern the run off of water in a given area and this determines the amount of water effective in soil formation.

STUDENT ACTIVITY

This is a laboratory investigation where you will do an experiment ot learn an important lesson involving lawn fertilizers. The equipment that you need includes:

1. Five flower pots of the same size.
2. One package of plant seeds (vegetable or flower).
3. Dirt enough to fill all five pots.
4. Approximately one cup of lawn food.

The steps that must be followed are:

1. Label the pots A, B, C, D, and E.
2. Plant six seed into each of the five pots.
3. Scatter one teaspoon of lawn food on the top of Pot A.
4. Scatter two teaspoons of lawn food on the top of Pot B.
5. Scatter four teaspoons of lawn food on the top of Pot C.
6. Scatter eight teaspoons of lawn food on the top of pot D.
7. Do not put any fertilizer in pot E.
8. Give each of the pots a like amount of water whenever needed. (Do not overwater the plants! Your mother might be able to assist you in the plant care.)
9. Make daily observations and record you results.
10. What conclusions can you draw from the observations that you have made? Remember that you should carry on this invertigation for at least two weeks.
11. Look around your neighborhood to see whether some neighbor has done this same type of experiment on a large scale. (His lawn) What do you observe?

SOIL PRODUCTIVITY

The productivity of a soil depends not only upon its ability to furnish nutrients but also upon water available for plant growth. The parent materials of Minnesota soils contained most of the elements necessary for plant growth. The elements found in the parent material were not originally available for plant consumption. They were altered by the action of water, air, mild acids produced in the soil, and gases which together acted upon the parent material as it was originally deposited.

STUDENT ACTIVITY

Investigate the labels on various fertilizer packages found at your neighborhood store. On each label there will be a list of the materials contained within the sack. The percentage by weight is also given. A fertilizer with a bag labeled 20-10-5 would contain twenty percent of one material, ten percent of a second, and five percent of a third. Make a list of at least five different brands of fertilizer giving their name, percent of each material contained, weight of sack or package, and price per sack or package. Construct a table as follows:

BRAND NAME	% OF MATERIAL A	% OF MATERIAL B	% OF MATERIAL C	PKG.WT.	PRICE

If you use some mathematical skills you might figure out the price per pound of each type. Do you notice that some fertilizer brands cost more than others? Try to think of some reasons why this might be true. Discuss the topic of fertilizers with some adult (perhaps even a store employee). If you were going to buy a lawn fertilizer today, which of the brands you investigated would you purchase? Why?

III. Outline of Content

The main emphasis of this unit is reading and listening to animal poems. This unit may be tied in with the Nature Appreciation or Animal Fiction Units in this curriculum guide, or they may be taught as a separate unit. It may be used in a team approach by the English teachers or, for that matter, used by teachers in other content areas as a reference from which they may select that which ties in most directly with their units. The Science teachers, for example, may wish to use the poem, "Four Little Foxes" with a unit on predators or on any unit dealing with man's role in the balance of nature.

The following pages are composed of several animal poems along with some discussion questions. Since each selection is on a separate page, the teacher will also be able to duplicate for classroom use those poems which he chooses to use. Many of these poems, along with good pictures, may be found in Reflections on a Gift of Watermelon Pickle, compiled by Dunning, Lueders, and Smith.

MODEL

FOUR LITTLE FOXES

by Lew Sarett

Speak gently, Spring, and make no sudden sound,
For in my windy valley, yesterday, I found
Newborn foxes squirming on the ground--
Speak gently.

Walk softly, March, forbear the bitter blow;
Her feet within a trap, her blood upon the snow,
The four little foxes saw their mother go--
Walk softly.

Go lightly, Spring; oh, give them no alarm.
When I covered them with boughs to shelter
from harm,
The thin blue foxes suckled at my arm--
Go lightly.

Step softly, March, with your rampant hurricane;
Nuzzling one another, and whimpering with pain,
The new little foxes are shivering in the rain--
Step softly.

Discussion Questions

Literal Interpretation:

1. Why are the baby foxes alone?
2. What does the author do with them after finding them? Will that help?
3. How do you think the author feels toward things in nature?

Poetic Structure:

1. What type of structure does this poem have? (rimed or free verse)?
2. What images do you get from reading this poem?
3. Find examples of the following terms in this poem:
   repetition --- personification----
   refrain------ imagery----------

Ecological Content:

1. In what way has man interferred with the balance of nature in this poem?
2. Why is spring such a bad time to trap foxes?
3. What will probably happen to the baby foxes?

"POLLUTION SOLUTION: COMMUNICATION"

I. Overview

This unit, while multidisciplinary in structure, relies primarily on the concept of communication as a means of solving social porblems--the problem in this case being environmental pollution and overpopulation. The teaching team, involving one science, one social studies, and one English teacher, will work together in such a way as to bring about behavioral changes on the part of students as a result of experiences which:

1. Demonstrate the cause and effect relationship of human activity with pollution of the natural environment;
2. Demonstrate the social implications of pollution and overpopulation and appropriate methods of civic action;and;
3. Demonstrate the value of communication as a tool with which to bring about social change--in this case, the elimination or reduction of environmental pollution and the control of human population growth.

The environmental problem very naturally provides a separate and complementary role for each member of the team.

The science teacher carries out those activities which will demonstrate the cause and effect relationship of human activity with pollution of the natural environment. Specific activities and objectives for this phase of the unit will be detailed by the science representative on the writing team, while conferring with the social studies and English team members.

The social studies teacher will carry out activities which will demonstrate the impact of pollution and overpopulation on society. Specific learnings in the area of civic responsibility, culture, economics, business, and legal process will be emphasized. Activities and objectives for this phase of the unit will be detailed by the social studies teacher in cooperation with the science and English team members.

The English team members will be concerned primarily with language arts activities in which students may engage which will:

1. Enable them to gain an understanding of the environmental problem as it relates to them and the world around them, and;
2. Develop communication skills which they may use as a tool to bring about social action which they deem necessary to solution of the problem.

*Special Note: Because of the nature of this unit there are two important elements of instruction which teachers must be aware:

1. In order for the student to communicate to others his feelings about the environmental crisis, he must be informed and knowledgeable of the problems whereof he speaks. This will come as a result of information gained through listening and reading under the guidance of the teacher(s) in the early stages of this unit.
2. The element of student motivation is very important in this unit because the concept of communication as a solution to pollution is based on the premise that the student will want to communicate to others the need to

preserve our environment. This will come as the student becomes informed of the problem and of avenues of communcation available to him in working to solve the problem.

II. General Objectives or Purposes of the Unit

A. Understandings

1. Human activity produces various types of pollution which damages the natural environment in various ways.
2. Some type of pollution are:
   a. air pollution
   b. water pollution
   c. radiation pollution
   d. visual pollution
   e. sound pollution
   f. litter of roadsides and public and private property
   g. human pollution (drugs, smoking, disease, etc.)
3. Pollution affects:
   a. human health
   b. plant life
   c. aquatic life
   d. animal life
   e. quality of living
   f. human relations
   g. wilderness areas
4. Some major causes of pollution are;
   a. motor vehicle exhaust
   b. industrial waste deposited in air and water
   c. human waste deposited in water
   d. urban sprawl
   e. littering on public and private property
   f. poor conservation practices
   g. jet planes
5. Pollution terms students should know are (students and teachers should compose satisfactory definitions together):
   a. ecology
   b. environment
   c. pollution
   d. returnables
   e. recycling
   f. "throwaway culture"
   g. detergents
   h. population control
   i. pesticides
   j. herbicides
   k. fertilizer
   l. BWCA
   m. putricibles
   n. non-putricibles
   o. biodegradable
   p. non-degradable
   q. public domain

r. non-renewable resources
s. renewable resources
t. conservation
u. biology

B. Attitudes

Because of the important role of attitudes in the creation and control of pollution, the following attitudes should be instilled in students:

1. The desire to convince others of the urgency of the environmental crisis.
2. The desire to seek solutions to social problems such as pollution through communication.
3. An optimistic attitude that pollution of the environment <u>can</u> be solved through cooperative effort.
4. The belief that every individual does have the opportunity to work constructively to solve the pollution problem.
5. The belief that communication, oral and written, is the most effective method of dealing with pollution problems.

C. Skills

The following language arts skills will be developed as a result of activities of this unit.

1. The ability to read and literally comprehend newspaper and magazine articles on pollution. Most useful skills are skimming for appropriate articles, adjusting rate of reading to difficulty of material, comprehending the author's message through recognition of main points and significant details, and evaluating the basis fo logic and other sources of information.
2. The skill of selective reading, as a major portion of the time will be spent on assembling research data and will involve finding written material which ties in with and provides information about some specific topic. For example, if a student is doing a research paper such as "Oil Leaks and their Effect on Wildlife," he will be forced to sort through much written material on oil leaks and select only those portions which deal with their effect on wildlife. Such activities, along with direct teacher instruction on the necessity of being selective when doing research, should provide a valuable reading skill developing exercise.
3. Vocabulary-building skill may be developed in this unit in several ways:
   a. The teacher should teach directly and reinforce through frequent use during the unit of the vocabulary words listed above in "understandings." Various word game approaches such as "Hangman" are useful for this purpose.
   b. The teacher should instruct students to use "context clues" in determining the meaning and use of new words encountered in reading. Here the student decides the meaning of a given word by analyzing its relationship to other words in the sentence; in other words, through the context of the unknown word. It is important to remind students that new word meanings can be <u>learned</u> by <u>thoughtful</u> reading. Students must be discouraged from the bad habit of "skipping over" every new word encountered, which leads to no new growth in reading skills.
   c. The teacher can further advance reading vocabulary development by encouraging students to inquire about the meaning of new words they hear and read. Many meaningful classroom discussions are precipitated through student inquiries about word meanings. Students may

ask the teacher, other students, or other adults for help.

Writing Skills

Writing skill is an invaluable asset to anyone wishing to communicate ideas to local, state, or national figures who cannot be contacted in person. It has been said that for every letter a politician receives there are 100 people who share the feelings of the letter writer. It should go without saying, also, that the impression made on the official is directly related to the legibility and overall feeling of the letter written. Students should develop the following writing skills:

1. Writing original articles in a clear and legible fashion. Specific skills are:
   a. Writing complete snetences.
   b. Using the very best handwriting to achieve the highest degree of legibility, neatness, and readability.
   c. Spelling and punctuating correctly.
   d. Structuring each paragraph around a separate thought and including a topic sentence, supporting sentences and concluding sentence when appropriate.
2. Writing a business letter in proper format (see appendix).
3. Writing a research paper in proper format.
   a. English teachers may have a favorite format or reference book for research papers which they will wish to use with the assignment. If not, there are several good references available for research paper guides. Below are examples:
      The Research Handbook: A Guide to Reference Sources, by Adrion A. Paradis.
      Research in Written Composition, by Richard Braddock Reed.
      The Research Paper by Lucyle Hook.
4. Writing original poetry in one of the following forms;
   a. free verse
   b. rimed couplets
   c. limerics
   d. varied rime schemes
5. Proofreading all rough drafts and handing in only rewritten work which has been corrected for accuracy.
6. Writing original skits or fiction articles which are interesting and easily read. Main writing skills here are proper use of quotation marks, end punctuation, and use of descriptive words (adjectives and adverbs).

Listening Skills

Listening, often overlooked as a skill, is one of the basic tools of learning in our society today. It is estimated that 45% of our working time is spent in some type of listening activity and upwards to 75% of what we learn is gained through the listening process. It is for these reasons that the teacher may wish to remind students of the need to listen actively and with a purpose instead of merely hearing what is said.

1. The ability to listen with a purpose.
2. The ability to concentrate while someone is speaking.
3. The ability to listen actively to a speaker and isolate main ideas and supporting details.

4. The ability to evaluate and criticize what is heard.
5. The ability to listen quietly and courteously, even though the listener may not agree with the speaker.

Speaking Skills

Speaking skills are especially useful in communicating with peers, parents, neighbors, and local officials. Because the area of pollution involves some controversy, and because many solutions to pollution problems are to be found in local issues, the importance of speaking as a means of achieving pollution solutions cannot be underestimated.

Speaking skills to be developed are:

1. Expressing one's personal ideas in an unemotional and controlled manner.
2. Speaking courteously and convincingly over the telephone (assuming the proper background understandings of pollution have been acquired).
3. Speaking effectively to groups. This involves skill in preparation and organization of the speech, speaking posture, voice volume and pitch, and speaking rate.
4. Discussing current issues in class in a confident manner, and at the same time, not assuming to be more knowledgeable than one is.

III. Outline of Content

A. Descriptive outline of unit

This unit is designed to be taught by the English teacher alone or in cooperation with a social studies teacher and a science teacher. If the English teacher works alone, he must make some attempts to carry out the roles of the other two teachers as outlined in the overview; he must provide some experiences which will demonstrate the cause and effect relationship of human activity with pollution, and he must also show the social implications of pollution and overpopulation. Such an approach will require some effort on the part of the teacher to become informed of environmental problems and issues to which his students should be exposed. The "Resource Guide" in this curriculum will provide some useful understandings, as will the reading lists in this unit.

If the English teacher has the benefit of working as a team with a science teacher and a social studies teacher, his task will be much simpler. He may then rely on them to provide scientifically and socially oriented learnings as outlined in the "Overview" while he is left to concentrateon language arts activities as they relate to the environmental crises. Now he will find that a lab oriented approach will work best for his purposes. Students are given a variety of options as far as which activities in which they wish to participate. More advanced students may wish to do a scholarly research type assignment on some specific area of special interest. Other students may prefer writing letters to government officials while some may be content to be reading and clipping articles to be placed in a scrapbook. All students should be encouraged to participate in some kind of activity for each of the four language arts areas; credit for each activity should be given according to the amount of work involved, the relevance of the activity in relation to the problem, and the quality of the finished product.

The teacher may wish to set up, perhaps with the participation of the students, some minimum requirements or contributions for this unit on the part of the students.

B. Readings (Some of the following will be included in the appendix and may be reproduced for student use.)
   1. "How to Control Pollution"
   2. "Now is the Time for All Good Men to Come to the Aide of Their Planet"
   3. "Art Buchwoald's Column--Solution to Pollution"
   4. "Can You Imagine a World Without Trees?"
   5. Letters to the Editor
   6. "The Lesson of Rachel Carson"
   7. "Experiment by Anoka Teens. . ."
   8. "Anti-Pollution Rhymes"
   9. "Out of the Fog"
   10. "Mankind's Greatest Enemy is Mankind"
   11. "Open End"
   12. "The Most Beautiful One in the World"
   13. "Prosecuting Pollution"
   14. "This Terrestrial Ball"
   15. "Hunger*Population*Pollution Fact Sheet"
   16. "You and Noise"
   17. "Swimmers--Beware"

C. Supplementary materials
   1. Films, Filmstrips, and TV
      Many free films and filmstrips are available through such agencies as the United States Department of Health, Education, and Welfare and the Ramsey County Tuberculosis and Heart Association. Also, TV specials frequently deal with pollution and Channel 2 educational TV has weekly programs. Teachers may wish to give credit for home TV viewing by accepting slips from home stating the program was watched by the student or having discussion questions answered in writing or by having short summaries written of main content of programs.
   2. Supplementary reading (For teacher use--he may wish to make selective reading assignments from these)

Carson, Rachel, 1962. Silent Spring, Houghton-Mifflin Company, New York, 262 pages

Shurcliff, William A. S/S/T and Sonic Boom Handbook, Ballantine Paperback, New York, 146 pages

Marx, Wesley, 1967. The Frail Ocean, Ballantine Paperback, New York, 274 pages.

Carson, Rachel, 1955. The Edge of the Sea, Signet Paperback, NewYork, 232 pages.

Storer, John H., 1968. Man in the Web of Life, Signet Paperback, New York, 145 pages.

DeBell, Garret.,ed., 1970. The Environmental Handbook, Ballantine Paperback, New York, 34 pages.

Schwarts, William, ed., 1969. Voices for the Wilderness, Ballantine Paperback, New York, 366 pages.

   3. Suggested activities
      a. Reading--Have students:
         learn to use the Reader's Guide to find and read periodical literature

on environmental problems;
read the short non-fiction poetry, and letters to the editor in the appendix of this unit. Each of theses genre should be treated as a separate type of literature or written communication with a common topic--pollution of the environment. These should serve as models for student writing and may be reproduced and handed out for this purpose;
read nature poems by such authors as Robert Frost, Carl Sandburg, and others;
read nature prose by authors such as Jack London, Robert Service, and Jack Kimball; and,
read old newspapers and look for pictures to trace contrasts in natural terrain and the local environment.

Writing: Have Students Write:

1. Original articles presenting a position or point of view.
2. Summaries of magazine and newspaper articles on some phase of environmental problems.
3. Letters to a manufacturer urging some type of environmental control improvements.
4. Letters to a local, state, or national official urging some type of environmental protection, action or legislation.
5. Letters to the editor expressing a position or point of view.
6. A documented research paper on some environmental problems: "Noise Pollution", "Oil Pollution", etc.
7. A petition urging some type of social action.
8. Pertaining to nature or environmental problems;
   Original skits
   Original poems
   Original fiction
   Original slogans
   Original limerics

Listening: Have Students Listen To:

1. Outside resource persons such as ecologists, scientists, local officials, etc. on environment.
2. Representatives fo business and industry giving their views on environmental problems.
3. Tapes and records on environment.
4. Other studnets speaking on environment.
5. Panel reports on environmental issues.
6. Class discussions (use articles in appendix of this unit as basis of discussion).
7. Individual reports.
8. Special TV or radio programs on pollution
9. Debates on controversial environmental issues (See Debate Unit in this curriculum guide)
10. Older people in the community tell about what has happened to the local environment in the past years as a result of urban growth.

Speaking: Have Students:

1. Make a sound video tape or movie on littering, local pollution problems, etc.
2. Have debates on controversial issues relating to pollution.
3. Give a speech on the class expressing their views on some environmental issue.
4. Call a local official by telephone and state their views on some issue.
5. Speak to a local official and tell him their views on some issue.
6. Speak to family members or neighbors in regard to some environmental issue.
7. Discuss current environmental problems in class.
8. Present panel reports on environmental problems.
9. Discuss special TV programs or films and tapes on pollution.
10. Speak to elderly residents in the area to find out about how much change has taken place in the area as a result of urban growth and industrialization.

Visual Media: Have Students:

1. Make scrapbooks of clippings, articles, and pictures on environmental problems.
2. Take pictures of local pollution and show class.
3. Make anti-pollution posters and place around school or community.
4. Watch special TV programs and films on pollution, garbage disposal, etc., then write reactions or summaries or discuss in class.
5. Borrow old pictures of the area from elderly residents and contrast the local environment as it was in the past with what it is today.

4. Behavioral objectives (minumum essentials)
   a. Students will be able to write a well-structured paragraph which includes a complete topic sentence, complete supporting sentences, and where appropriate, a complete concluding sentence.
   b. Students will be able to write summaries which include only main ideas and important details of newspaper and magazine articles which they have read silently for this purpose.
   c. Students will be able to write a business letter which includes all the essentials of the model business letter in the appendix of this unit.
   d. Students will be able to write a letter to the editor which includes all of the essentials of the model letters to the editor which are included in the appendix of this unit.

YOUR MOM AND YOU AS ENVIRONMENTALISTS

I. Overview

A. In the daily activities of a housewife, she ahs many opportunities to aid the environmental struggle. Through the purchasing power of the modern woman, she is able to control the products being marketed and thus become a moving force in the areas of pollution control, resource conservation, and solid waste disposal.

II. General Objectives or purposes in studying the unit

A. Understandings

1. The student will be given a number of products or practices that somehow do damage to the environment by polluting, wasting or creating disposal problems. Each practice shall be a common occurrence in the average household. By observing his surroundings, the student will become aware of the amny areas of concern to environmentalists.

B. Attitudes

1. The student will gain an awareness of the many products available that are damaging to our environment but yet are found in most households.

C. Skills

1. The student will be able to select certain products or practices and explain the relative degree of damage done to the environment as a consequence of their existance.

III. Outline of Content

A. Description outline of content

1. Introduction: The point that should be stressed in the introduction that the unit is not designed to be critical. The student should not <u>demand</u> that all "Undesirable" practices cease but rather point out the long-range effects they have upon the environment. The <u>decision must</u> be left up to the adult.
2. Student Activity: The student shall search throughout the household for all types of undesirable environmental practices. Additional examples may be added to the list as searches and discussions progress.
3. Rationale: Just as many little drops of water amke an ocean and grains of sand a beach, so too do many small acts of pollution create a problem. The items chosen for this list are found in or around most houses. Special consideration must be taken into effect for apartment or house trailer dwellers.
   The basis for point subtraction is not totally unquestionable and could be changed whenever desirable.
   Disposable containers were assigned points according to: (1) amount of mineral resource removed, (2) decomposition rate, and (3) solid waste disposal capabilities.
   Colored toilet paper adds phosphates to the water systems which connected to a public sewer.
   The use of paper napkins, towels, and cups add pressure for the removal of forest reserves and create disposal problems.
   Paper products as magazines and newspapers, are capable of being recycled. This would lessen the pressure on forest products and also diminish the bulk of solid waste that is disposed.

The unit on air pollution gives justification as far as backyard burning is concerned.
The new biodegradable detergents do not create the foam that gives dramatic proof of pollution, but they do add a phosphate fertilizer to the water which aids in the development of algae; that scum we are all too familiar with.
Aerosol spray cans contribute foreign substances into the air, and they have been labeled a possible health hazard by some authorities.
The Flying Insect Strips that can kill 20,000 insects in an hour's time would seem to pose a threat to creatures other than insects. Does it pay to take chances? Must the good be destroyed along with the bad?
The effects of smoking have been documented enough by various workers. Upon entering a smoke-filled room one can determine the effects upon the immediate environment.
Chlorinated hydrocarbons are very damaging for the immediate and long-range effects upon the environment. They are not selective among their victims, and are able to travel long distances through food chains and have long periods of destructive capabilities.
Combination lawn fertilizers that fertilize, kill weeds, insects and small animals can be devastating to one's local envrionment. Few people would complain at the loss of mosquitoes or crabgrass, but the chemicals that destroy these items also ride the area of ants and earthworms. These unheralded creatures make the many small holes in soil and provide it with the needed aeration. This also make for better water absorption and retention resulting in a more luscious plant growth.
Continual unnecessary usage of the auto engine drains fuel resources and pollutes the air as some can evidence from the air pollution unit in this book.
Large area spraying accomplishes the same devastation as combination fertilizers.
A leaking faucet wastes tremendous volumes of water. Most local water departments will supply a table showing the amount of water lost which is dependent upon the frequency of drips.

B. Readings Used in Calss
   1. Water Pollution is an Urgent Problem: Sierra Club
   2. Audobon Guide to Pesticide Do's and Don'ts: Roland C. Clement
   3. The Garbage Explosion: Charles A. Schweighauser
   4. Phosphate Content of Laundry Products: Wisconsin Resources Conservation Council

C. Supplementary Materials
   1. Films and Filmstrips
      a. Litterbug: Walt Disney animated cartoon available from the Minnesota Department of Conservation; free of charge
      b. Heritage of Splendor: anti-litter picture narrated by Ronald Reagan available from the Minnesota Department of Conservation; free of charge.

D. Suggested Activities
   1. The list given for evaluation may be enlarged and discussed as far as point assignments are concerned. It should also be repeated at three-month intervals to see if notable improvements are discernible.

2. Field trips could be arranged to the local sanitation plant or to a nearby landfill area where the students could view the problems created by the abundance of disposable containers or other "throw-away"products.

E. Behavioral Objectives for Each Student Activity

1. The student will search their homes for practices and products deemed environmentally unacceptable and report the findings on the checklist that accompanies the unit.

YOUR MOM AS AN ENVIRONMENTALIST

This exercise is not designed to criticize your mother, but rather to call attention to the many little daily occurrences that we all engage ourselves in. When added together, these daily occurrences may create serious pollution problems, result in a large loss of mineral resources, overtax an already burdened solid waste program, or perhaps do all three. Disposable metal cans lower the amount of available mineral resources and create problems for solid waste disposal while certain detergents add phosphates to the water resulting in the green scum we are all too familiar with.

Each mother will be given 1,500 points. If she engages in certain "bad" environmental practices, a certain number of points will be subtracted. Perhaps with a few words of encouragement, you may help your mother become a person more aware of the environmental issues.

YOUR MOM AS AN ENVIRONMENTALIST

Practice or Product	Point Value	Points Subtracted From Her Total
*for every six-pack of disposable aluminum beverage cans	50	_____
*for every six-pack of disposable steel beverage cans	45	_____
*for every six-pack of disposable glass beverage container	25	_____
*for using colored toilet paper	50	_____
*for using paper napkins on the household table	25	_____
*for using paper toweling for dusting or cleaning	25	_____
*for using paper cups	25	_____
*for discarding newspapers and magazines	100	_____
*for engaging in backyard burning	250	_____
*phosphates in detergents--subtract one point for each percentage of phosphate contained within the product		_____
*use of aerosol spray cans (perfume, hair spray, etc.)	50	_____
*use of Sh_ _ _ Oil Company Flying Insect Strips within the confines of the home	100	_____
*smokes cigarettes	50	_____
*use chlorinated hydrocarbons to kill insects (Aldrin, Dieldrin, DDT, Endrin, Heptachlor)	200	_____
*Uses combination fertilizers (those containing insecticides or chemicals used to kill weeds)	150	_____
*sprays the entire yard to control plants or insects	150	_____
*allows the car motor to run when not in motion	100	_____
*does not repair dripping faucets	100	_____
*maintains and operates an electrical dishwasher	100	_____
*maintains other unnecessary electrical appliances such as mixers, hair dryers, knife, can opener, etc.	25 each	_____
*operates a clothes dryer when the weather is such that the clothes may be hung outside	100	_____

YOURSELF AS AN ENVIRONMENTALIST

In our daily activities we often evaluate others, but seldom do we take a close look at ourselves. In this exercise we will look closely at our acts and practices as they relate to the environment. We will probably discover that there are some practices that we follow that are damaging to the environment. They may create pollution problems, result in a loss of mineral resources, create problems for our solid waste program or perhaps do all three.

Each student will be given 3,000 points. If they engage in certain "bad" environmental practices, a certain number of points will be subtracted. The long-range goal of this exercise is to increase your point total until none will be subtracted and you will then be a Class I Environmentalist.

Practice or Product	Point Value	Number of Points Subtracted
*for every disposable aluminum beverage can	50	_____
*for every disposable steel beverage can	45	_____
*for every disposable glass beverage can	40	_____
*for every one quart disposable glass beverage container	100	_____
*for using paper cups to save daily dishes	50	_____
*for using paper plates to save daily dishes	60	_____
*for discarding newspapers and magazines	100	_____
*for starting fires in woods, vacant lots or in your backyard	250	_____
*smoking cigarettes	100	_____
*allowing gasoline motors to run when not in use (lawn mowers, cars, etc.)	100	_____
*breaks brances or tears leaves off bushes and shrubs	200	_____
*kills insects, spiders, snakes, frogs, birds, etc. without valid reason	250	_____
*buys ice cream products wrapped in aluminum foil	50	_____
*discards small pieces of paper, etc. around neighborhood	150	_____
*Litters school property	100	_____
*has never planted a tree or shrub	100	_____
*has never planted flowers out of doors	50	_____

*has never spent volunteer-service time in cleaning up public parks, beaches, or roadways	150	_____
*does not attempt to persuade parents to practice goals or ideas in the least environmental interest	200	_____
*does not encourage friends to follow good environmental practices	250	_____
*engages in wasteful practices such as throwing away half-used tablets, discarding food, etc.	150	_____
*destroys property of others (breaks pencils, ruler, etc.)	150	_____
*does not take care of personal items (shoes, clothes)	150	_____
*does not turn offlights when not in use	150	_____
*has own TV set	100	_____
*plays radio, television, or other appliances when not in use	200	_____

4. Suggested activies.
   a. Writing activities.
      (1) Have students write various sources for air pollution material. Be sure they say specifically in what phase of air pollution they are interested and also that they use a good business letter format. (See appendix.)
      (2) Have students write a documented research paper on some phase of air pollution. (See appendix for bibliography.)
      (3) Have students write short themes expressing personal views on air pollution.
      (4) Have students write to local state, or national officials urging them to take action to combat air pollution.
      (5) Have students compile a list of major sources of air pollution in their local community for use in research and lab activities.
      (6) Have students report on lab activities. (See writing skills for reporting format.)
      (7) Have students write a satirical poem about air pollution.
      (8) Have students summarize articles from magazines or newspapers on air pollution.
   b. Reading activities.
      (1) Have students read newspaper and magazine articles on air pollution.
      (2) Have students read parts of books or whole books on air pollution; The Unclean Air by Louis J. Butlaw.
      (3) Have students read pamphlets such as Our Polluted World (A.E.P. Unit Books), Air Quality Education (Minnesota Pollution Control Agency), and others. (See #3 Supplementary Reading in Appendix.)
      (4) Have students read advertisements in current periodicals to analyze attempts by industry to convince the public of their anti-pollution measures. Are these real, measurable steps, or merely talk?
   c. Speaking activities.
      (1) Have students telephone a local official or representatives of some group and interview the person on some phase of air pollution. Perhaps a business man can tell them what his company is doing to combat air pollution.
      (2) Have student prepare a report to the class on some topic such as:
         (a) "Air Pollution as a Health Hazard."
         (b) "Dangers of a Temperature Inversion."
         (c) "Outdoor Burning as a Form of Pollution."
         (d) "Progress and Air Pollution."
         (e) "People, Cars, and Air Pollution."
         (f) "The Steam Car as an Alternative to Internal Combustion Engines."
         (g) "The Electric Car as an Answer to Air Pollution", etc.
      (3) Have students prepare a research based on interview situation with student "expert" on air pollution. This could be in the form of a radio or TV broadcast."
   d. Listening activities.
      (1) Bring an expert on air pollution into the classroom to speak on his field of specialization. Have student listen to and evaluate his ideas.
      (2) Have students listen to tapes and TV programs expressing various points of view. In class discussion, call on students to compare and weigh

various view points on pollution causes, effects, and controls are described on the tapes and broadcast. Programs such as "Environmental News" on Twin Cities Channel 2 are useful for this. Teachers should watch for TV or radio specials on air pollution and provide student incentives to watch them. A note from home is a simple means of proving that a student has watched a program.

(3) Have students listen to sounds of machines which they can identify as air polluters; lawn mowers, automobiles, jet planes, motor bikes, a nearby factory, etc. Count the number heard in five minutes. Debate which produces the greatest amount of pollutants.

(4) Have students listen to records such as Tom Lehrer's "Pollution".

(5) Have students listen informally to other students expound on their ideas on air pollution. A basis for such discussion could be exercise questions discussed in small groups to be relayed to the whole class. (See appendix for discussion questions.)

5. Behavioral objectives.

a. The student will be able to define in writing the following terms with 100% accuracy.

(1) air pollution
(2) Carbon monoxide
(3) carbon dioxide
(4) combustion
(5) convection
(6) environment
(7) fossil fuels
(8) greenhouse effect
(9) inversion
(10) sulfur dioxide

b. The student will be able to explain with the aid of a self-made diagram, the atmospheric conditions during an air inversion.

c. The student will be able to write a one-paragraph essay explaining the peculiar weather effects created about a city (Heat Island Effect). He will use correct spelling, capitalization, and punctuation.

d. The student will be able to trace the sulfur from a combustible substance through its transformation into either sulfurous or sulfuric acid, explaining a minimum of three harmful effects they may create upon our environment.

e. The student will be able to trace a hydrocarbon compound through the process of combustion and name the two most familiar end products.

f. The student will be able to write a written explanation of how asbestos enters the atmosphere and the damaging effects it may have upon the human population.

g. Given the appropriate equipment, the student will be able to set up and carry out one of the air pollution experiments mentioned in this unit. Observations will be carried out and a written report filed with the teacher at the end of the investigation.

7. Lab activities.

a. A slide-taking trip into an industrial area to show amount of pollution put into the air by manufacturing companies.

b. Obtain two terrariums with tops so that they may not allow the air to enter or leave. Begin thriving communities of plants in each. In one terrarium, burn a small amount of sulfur each day. (Burning five or six kitchen matches is sufficient.) The second terrarium does not receive the sulfur treatment. Observe changes within the plants in both terrariums.

c. Obtain two identical incubators and a supply of hatching eggs. With all other conditions remaining the same, into one of the incubators burn a small amount of sulfur daily. Observe the hatching process. Open all unhatched eggs from both incubators. Then ask the question: "Is ther a noticeable difference between the hatching success and/or the state of embryological development?"

d. Take air samples from various parts of local community or entire city to see what relationship is between areas and functions of locale. This experiment can be done easily with the use of a woman's nylon stocking, which will deteriorate when exposed to high concentrations of air pollution. The same procedure can be accomplished by taking white strips of adhesive tape and placing them on a hard-backed surface with sticky exposed upward. You may use various metals such as copper, zinc, silver plate or strips of these metals and exposing their surfaces to air pollution. Also, one may expose open containers of water to polluted air zones and check debris count by settlement in bottom of pollution particles.
e. Set up an air watch or check in which students actively watch for visible signs of air pollution in the community or city and report findings to class to later report to a local pollution control agency. Students serve in watchdog capacity and call on student hotline any source of air pollution seen. One could divide class into callers, spotters, student filers, student coordinators, etc.
f. Students gather magazine and newspaper articles on air pollution and on a basis of pollution problems and what is being done about it.
g. Students print and hand out literature in community about the necessity of combating air pollution.
h. Students, after unit learning process is complete, may be allowed to talk about air pollution to other classes in their building or to an elementary class on the problems and solutions.
i. Manual dexterity will be increased and fostered if students are allowed to construct necessary general equipment needed in experiments when possible.
j. Students may interview various vested interests in the community and report to the class on attitudes of companies, civic leaders, conservation groups, and government on their views of air pollution.
k. Students may arrange for guest speakers, with approval from administration and teacher to come and talk to sutdents on air pollution.
l. Have students develop a presentation using slides, lab experiments, and research for possible presentations on audio visual or recording tape. Allow students to organize materials, research, and present program of about 1/2 to 1 hour in length. Provide incentive to show constructive solution to air pollution problems. Interviews, editorial comments, skits produced by the students may also be utilized effectively.
m. Students make maps and graphs featuring data on how pollution affects community and various trends in pollution problems over a period of time.
n. Have students make scrap books showing pictures of air pollution with editorials, poetry presented on bordering pages either written by students or taken from newspapers and magazines. May feature words from modern and pop music in coordination with pictures in the scrapbook.
o. Make slides from magazines or actual pollution pictures taken by students. Set up a slide presentation in which pictures of the beauty of nature begins the series and porgressively becomes more polluted, finally ending with the complete destruction of nature. The process may be done in reverse of the above showing methods of cleaning up the air pollution. Music may be added for effect. This presentation may be done as part of a student presentation.
p. Students draw a cartoon depicting man in his environment with air pollution as the main theme.
q. Student development of posters, collages, and bulletin boards for classroom to give setting for unit development.

ENVIRONMENTAL ACTIVITIES--INTRODUCTION

This section relates primarily to environmental activities that students and myself have determined to be successful both in and out of the classroom. Some explanatory sheets have been incorporated into this outline to demonstrate how we are continuously striving to get students involved and participating. A reasonable balance between in-class and out-of-class activities has been utilized in this brief write up. Many activities not detailed here will be available in another publication shortly.

Most adutls have realized, after reviewing their educational process, that in general the sterile courses where those where the extent of student participation was limited to reading, writing, listening, and testing. We still do these educational niceties; but in addition, we have hopefully added more of the practical and long-remembered "get off your gluteal pedestal" type of activities. A check of the list of goals for the course on the Student Evaluation sheet will perhaps clarify this statement.

It is this writer's view that for any educational program to be successful and meaningful to the students involved, some interdisciplinary environmental approach must be employed. Techniques to interrelate disciplines, courses, and subject matter have been initiated by energetic administrators, teachers, and students. I have found that by being a good listener and a poor lecturer--student ideas, both good and bad, flow continuously. Some of the best ideas and pressures for change have come from the recipients of the educational process--the students.

A will to try ideas and a will to communicate those ideas on environmental education between disciplines has proven rewarding to students, teachers, schools and communities. In our school biology and math have worked together to gel biostatistics which both disciplines use. Social studies use our Indian materials which we have excavated to fortify their work on Indian culture and we in turn hit those arease not covered by social studies and thereby interrelate common subject matter to two courses. The art people utilize many of our environmental materials such as birds, insects, and skeletons in their work. Most posters and window displays relative to our environment eminate from the art department. English and speech have moved into the environmental whirl by assigning more speeches, term papers and demonstrations to the environmental guidelines. Health, foreign languages, physical education, and industrial arts have all started environmental activities. There seems to be a continuous inquiry on the part of teachers relative to sharing ideas on environmental issues, problems and approaches.

Actions, rather than words, speak louder, longer, and linger in the mind of the student more vividly through time no matter how much expertise in oratory is utilized. A few stones in the world of environmental activities have been turned-- an entire mountain of stones is yet to be moved. It will take our combined efforts to do this task and we had better gear ourselves for the job at hand.

CLASSROOM ATMOSPHERE as an AID to ENVIRONMENTAL STUDIES

An environmentally oriented classroom will usually aid in helping students and the community to identify with their environment more readily. While it helps students to become stimulated, motivated, and educated, it might at times cause the teacher, some students, and some community personnel to become frustrated; and it might even cause some of the custodial staff and a few administrators to become infuriated.

A classroom is many things to many people; book storage area, four clean walls and a clean desk, a biological "desert", a "don't touch or mess area", or an interesting learning arena. A loaded classroom is an open invite to students to bring in something else--it's a way of encouraging, not discouraging students. A few added words from the teacher periodically will keep the environmental curiosity snowballing.

A teacher involved with environmental studies should not worry about odors and clutter that go with a good program anymore than a shop teacher is concerned about sawdust odors and boards of every description lying around or the odors associated with food preparation in Home Ec classes. Many times squemish, nonenvironmentally oriented teachers, custodians, and administrators can pressure teachers to become "barewall and textbook oriented." If a classroom exists for anyone else but the students, then this is one teacher who has been on the wrong side for many years.

Here are a few ideas that have worked in helping students to become oriented toward their environment just by coming to the classroom:

1. Abundance of life
   a. Some caged (mice, flying squirrels, chipmunks, etc.) for behavioral studies, feed for snakes, feeding habits, etc.
   b. Some turned loose-these have roamed our room: Canada geese, turtles, owls, opposum, bull snakes, starlings, hawks, red fox, bats, spiders, insects, bitch and litter, etc. They all have created fecal spots, but time erases these pollution smears; but attitude changes in students have persisted.
   c. Cripples life forms can be a continuous challenge to students to nurse back to health--encouragement is better than discouragement.
2. Pin insects on the ceiling, hang preserved birds and mammals from the light fixtures (It keeps insects out of them and they are ready to use), tie interesting invertebrates, wood samples, or bird houses on rails along the side walls.
3. A dermestid beetle colony will prepare many skeletons for class use, save the school money in ordering, and also show the interrelationships of scavengers in our environment. Unfortunately their work has a byproduct known as B.O. This does save giving directions to people looking for the life science room--"Just follow your nose."
4. In a double locked cage we keep two prairie rattlesnakes--fed only by the teacher. The teacher has been bitten twice accidentally while feeding and cleaning without any aftereffects whatsoever. Students have a change to see the feeding habits of a poisonous reptile and hear the sound that gives the snakes their name. Caution on this enterprise is warranted.
5. The usual aquaria, terraria, herbaria, are all of great importance.
6. Specimens for dissection are expensively and easily ordered but what does it do for the student besides giving him a memorable odor of a preservative and rob him of a chance to participate in obtaining dissection materials.

a. Earthworms and frogs are usually easily obtained in the fall for all the years work. We have kept frogs in water in gallon jars for 7 months--ever ready for any experiment. Saves the company money.
b. We have stockpiled in our large freezer or in a snow bank until ready to use: fox, sheep, calves, mink, and muskrat carcasses; birds, pigs, cats, fish, chickens and a host of wild mammals. These organisms can be obtained by students through phone calls, actual observation of road kills, contact with fur farms or farmers, ice fishermen, veterinarians, etc. It serves a several fold purpose of acquainting students with occupations using life science, families of students get involved, safer to use freshly frozen specimens, odor of life processes usually less offensive that preservative to most students, colors and contents of organs much more natural, and it saves much on the budget of the science department.
c. Stomach analysis, parasites, mortality factors, and harvestable surplus topics and projects are all spin-off facets of dissection which relate to the environment. Interrelating physiology, anatomy, and environment will add more meat to the the environemtnal program.

7. Wild plants that show interrelationships such as: dodder, milkweed, small oak tree, goldenrod, thistle, ragweed, clover, and dogwood can be dug up in the fall, potted, and will persist sometimes for several months. Teacher can demonstrate, give out needed list, show those that are not to be touched, and the room will be full. Expect some mistakes in identification.
8. A colony of ants, bees or termites in their respective containers can be a start for many discussions on population, human society interrelationships, and economics of organisms. Cut a hole in the window and the bees in a glass hive will compete with the best that TV can offer.

ENVIRONMENTAL ACTIVITIES INSIDE THE CLASSROOM

Success in educating humans is a slow and difficult process. It can become frustrating to both teacher and student unless there is much participation by both. Think back. . .the most memorable experiences are those we took a part in. . . not those someone told us about. The below activities relate to our environmental studies and have all proven successful for our classroom.

Experiments with living organisms:

1. Behavioral, food, IQ, and population studies are done on many organisms.
2. Pesticides, fertilizers, and isotope studies are used to demonstrate effects.
3. A pair of rattlesnakes (prairie) demonstrate their sound and feeding habits.
4. Other snakes are used to overcome ophidiphobia.
5. Check locomotion with a turtle, snake, bird, insect, mammal--losses at once.
6. Pond water--check for pollution and life forms in water--interrelationships.

Experiments with dead organisms:

1. Stomach analysis, autopsies, parasite checks etc.--most specimens.
2. Waterfowl population changes in area by tabulating species shot--wings and head
3. Deer livers and brains--check for parasites collected during season.
4. Embryology studies on deer road kills and relate to food and habitat quality.
5. Pathology checks on abnormalities and conclusions on causes.
6. Skeleton preparation by use of dermestid beetles.

Oral:

1. Debates on environmental controviersies: bounties, airports, power plants, continental drift, evolution, medical research on animals and other "hot" topics.
2. Extemporaneous 30-second reports on a specific subject area.
3. Weekly observation time--everone stays alert part of the time.
4. Current periodical 1-minute reports with a given environmental category.

Wildlife signs and sounds:

1. Pellet study for food habits on a given supply of a predacious bird's pellets.
2. Scat study for food habits for mammals.
3. Frogs, insects, mammals and birds--can be recorded in lab and in field.
4. Bird house construction after school(wood duck, bluebird, etc.)
5. Skulls of mammals show food habits, habitat, and some interrelationships.
6. Furs brought by students relative to fashion and endangered species.

Human Interrelationships:

1. American Indian's way of life with tools, weapons, etc. on hand.
2. Demonstrate a primitive weapon made by each student with no modern tools.
3. Economics of our environment--how wild plants and animals developed in the USA.

Thanks to plants:

1. Make a key in class from woody plants brought to class.
2. Several species of plants growing in different soils, light, temperatures, and moisture.
3. On given day everyone brings in seeds and leaves of plants to show variations.

Games:

1. Bingo type games covering many phases of course work.
2. Everyone given a dixie cup and 2 seeds. Students fill with any soil and care for plants in room. Champ crowned in x number of days for best growing plant.

3. Electric quiz boards for identification of wildflowers, birds, bones, insects.
4. Match up bird's beaks and feet from mass of preserved dried ones.
5. Match up mammal skulls with picture of mammals.
6. Team of 4 with board of 50 insects--champ team gets most in correct order in x minutes.
7. Test: Use cigar boxes around room-put living, dead, hypothetical, and reference material in box with questions. Students even love the test--many laughs.
8. Dead skunk in freezer. Illustrates diffusion and threat of diffusion--air pollution whenever door is opened.

Earth science and life:

1. Pseudofossils are common--collect and let students guess what"life" they represent.
2. Soil types-- examine each student's 1 cc sample under bioscope for composition.
3. History of life activities using fossils--dionsauer bones, mammoth tooth, or extinct invertebrate initiates extinction discussion, demonstration, and destiny.

Environmental Science Courses at Irondale

At Irondale High School several courses have aspects which relate to conservation. The science department has attempted to provide a varied approach to develop appreciation and concern for the natural environment.

The general biology course, designed for students with low reading abilities, provides approximately nine weeks of activities which helps the student to learn skills and concepts essential to a basic understanding of ecology. The approach utilized is the BSCS special materials, "Patterns and Processes". The student has many field experiences to reinforce an appreciation of the outdoors.

Those students who are especially interested in the study of the environment and its interactions may elect the quarter course "Ecology". Each student is given opportunity to learn techniques and concepts relating to the balance of nature. Students utilize many laboratory skills in the field to observe and measure events occurring in nature. The student at the end of the quarter is required to complete one project of his choosing.

The "Animal Study" course is designed to give the student an understanding of the natural history of various animals in Minnesota. Studies are made as to their identification, behavior, habitat, food, and general anatomy. Specific activities include the raising care, and study of live animals, as well as the preparation of study skin and taxidermy mounts of animals and fish.

In two of the other quarter classes brief exposure is given to activities that directly relate to conservation. In the microbiology course microbes are studied as to their essentiality to the web of life. The evolution course investigates whether man will survive in the world he has so greatly polluted.

The course "Issues in Science" (now titled "Environmental Problems and the Future of Man) was designed to afford the student the opportunity of learning about

current problems created by man's presence. The course is an interdisciplinary course taught by English, Social Studies, and Science departments.

ENVIRONMENTAL CURRICULUM IMPLEMENTATION REPORT:
JUNIOR HIGH MODEL

Implementation at Johanna Junior High of the Mounds View Environmental Curriculum Guide 7-12 can be described in four phases:

Phase 1 - In early October Environmental Curriculum Guides 7-12 were placed in the hands of department heads in the areas of English, social studies and science. They were asked to discuss implementation of teaching units with teachers in their departments. Additional copies were placed in the teachers' room for use by any interested teacher. Several teachers began studying the guide and planning to teach certain units in it.

Phase 2 - In November teachers in the areas of English, social studies and science in grades 8 and 9 began actual teaching of units in the Guide. These units continued on and new ones were begun through the months of December and January.

Phase 3 - In December a half day of release time was obtained for one science, one English, and one social studies teacher from Johanna. The English teacher was a member of the Curriculum Guide writing team. The main activity of the half day session was planning for implementation of the guide in an interdiscipline approach in the areas of science, social studies, and English. Plans were laid to set aside a major portion of a week for eighth graders to concentrate on a local environmental unit in an all day school activity. The nature of the program will center around problem solving. Date of the activity is early May. Teams of eighth grade teachers from all disciplines will work with students in planning and carrying out activities described in the Curriculum Guide. The projects will be flexible in time and design. There will be an over-all organization of well planned activities so harmony in the school is insured. Some possible projects, all based on the problem solving approach, are as follows:

Campus beautification - planting, landscaping, and clean-up

Land-use surveys

Letters of question and direction to legislators, manufacturers, and private citizens

Research - primary and secondary - on environmental problems

Speakers on environmental issues

Films on various phases of ecology and environment

Picture taking of natural scenes and ecological problems

Field trips to ecological problem sites and natural beauty sites

Discussion groups on environmental problems and issues

Camping and nature appreciation

Displays of pollution testing equipment and devices for exploring natural environment

Fund raising projects such as glass container collection drives and metal container pickup

Phase 4 - Students and teachers will evaluate the Curriculum Guide in terms of relevance to current environmental issues and usefulness in environmental education.

HOW THE ENVIRONMENTAL EDUCATION CURRICULUM CAN BE INTEGRATED WITH THE SOCIAL STUDIES CURRICULUM IN THE JUNIOR HIGH SCHOOL

Since the city has been synonymous with civilization the unit dealing with urban ecology can be profitably integrated with the social studies disciplines in the junior high school. The Civics, Geography and American History teacher can all, by exercising judicious selection of materials, develop part of their curriculum around the phenomenon of urbanization and its benefits and problems.

The geographer has always concerned himself with urban iste and location and how the natural resources and general physical environment have either aided or impeded urban growth and development. For example, because most early city sites were riverine, the unit on urban ecology can be used to emphasize the vital role rivers have played for the transportation of goods and materials in addition to providing a natural habitat for wildlife. The transformation of the river from an avenue for the travel of goods and materials, and just as importantly ideas, into a thoroughfare for the disposal of sewage and other waste materials can be most illuminating. The geographer can lead students to discover how the river which was at one time the city's lifeline, has now through carelessness, ignorance, and a callous disregard for nature changed from an incubator of life into a foul and poisonous threat to life. He can also encourage students to see the river as a resource which has been depleted and emphasize the material and aesthetic loss to all persons within the city. The pollution of the river also causes suffering to those persons hundreds of miles away, who must reap the bitter harvest of polluted river because of his fellow man up stream. At this point the critical fact that the contaminator hurts not only himself but many others can be underscored. In conclusion if the city constitutes the substance of civilization then it is imperative to strive for quality in our cities if we are to have quality in our civilization. For if the city dies so does civilization.

American History traditionally has been apologetic, extolling all things American and suspiciously viewing all things not American. It had mirrored what Henry Steele Commager has characterized as an American myth which suggest New World Innocence and Old World Corruption. Chauvanism is an addiction peculiar to new countries and hence American History is not to be condemned for its beatific quality. But now America is coming of age and it is the duty of the history teacher to portray America as it is as well as how it ought to be. A means to objectify the study of American History has been provided by the thrust of ecological studies.

The current ecological crisis provides the history teacher with the material to teach both the good and questionable aspects of the American experience. When teaching about American economic development, the teacher can illustrate how this country has been accorded abundant resources which many considered inexhaustible. Now the grim realities must be confronted. The History teacher can show how riveres, lakes and coastlines have been severly damaged by an industrial optimism which brooked no limitations. He can illustrate how the interlocking phenomenon of a urbanization and industrialization have combined to create serious ecological dangers and explosive social situations. He can provoke students to focus upon the incalculable waste which an unbridled economic system has spawned, and how we are now dangerously close to exhausting many vital resources which in turn will have profound social, economic and political impact.

Yet it is vital to teach the good America has done and is still doing and that it is not tool late to attack our problems. Thus the American History teacher is in a uniquely enviable position to cite examples of how people and government working together can secure enormous change for the good of all.

Civics courses have commonly dealt with governmental institutions - national, state and local. It is the duty of the civics teacher, to interest students regarding the function of the political apparati and the effectiveness of citizen involvement.

Since it is impossible to separate social concerns from politics, the role of the civics teacher in combating ecological problems is indispensible. It becomes his duty not only to city ecological crises but alwo to instruct students on how the people in a community and ultimately throughout the nation can organize and mobilize their concerns with the goal of influencing the politician. Ultimately it is hoped people can persuade legislators to sponsor legislation which helps alleviate the critical social and ecological problems now facing this country.

Furthermore, the civics teachers by instructing the student about his duty to act as enlightened and concerned citizen can be instrumental in persuading large numbers of people to enlist in the crusade against pollution. But to do this the teacher must possess an awareness of the problems on a general but not necessarily technical level. This knowledge will help him demonstrate the interrelationship between politics and social problems, ecology foremost among these problems. He can show how the multifold governmental agencies from the local village council to the Congress of the United States have been established to secure critical needs of the people who constitute this Republic.

Since politics and ecology are substantially united, political activism is needed but it can be both productive and personally threatening. Therefore it is essential that the academic community take a stand on environmental issues. Ecology is one problem which teachers can focus upon when instructing students about participatory democracy because it is an issue which concerns all persons. The quality of life if not its survival hinges on solutions to the environmental crises.

There are also other problems which social studies teachers are compelled to confront. A major problem is that of apathy or despair. It is crucial that problems be presented sanely with the objective of finding solutions. Now is no time for people to luxuriate in an unproductive state of hopelessness. There is no room for

pessimism when problems are pessimistic. A what's the use attitude solves nothing and actually aggravates the already critical environmental crisis. If ecological problems were created by man, then they can be solved by man. The scientist, humanist, historian, and others by cooperating can all help in this quest. Petty and crippling differences must be transcended for the benefit of all.

In conclusion the guide on environmental education is very good. It contains materials and activities which are sufficiently broad in scope to engage the attention of all students and technical enough to help students gain a certain degree of expertise in specific areas. The projects and activities suggested are both creative and educational. But is is this practicality which is most impressive for it teaches that all of us in our own unique ways are responsible for pollution and all of us have an obligation to correct pollution.

Robert Molloy

District Social Studies Chairman

Mounds View School District #621

Review Notes on the Environmental Education Curriculum 10-12

As a humanities teacher I appreciate the interdisciplinary approach of this curriculum guide. While, as former Govenor LeVander has said education has brought us the problem of polluted environment, education must also rid us of the problem. The education required to do this is diverse and multi-disciplined. It involves the most exact knowledge of which science is currently capable. It involves the dissemination of this knowledge to a population which must be aroused to act on its own behalf and which by the nature of intellectual and emotional capabilities probably cannot, except for a small number of its body, absorb the requisite scientific knowledge. This in turn means that teachers who cna make such absorptions must bring the vital, skeletal principles to the students-to-become-voters who mut in a shorter period of time than most wish to think about effect the social and legal controls which permit a livable environment. Since the survival of man, whether suffering from ghetto pollution, strip mining pollution, air pollution, or choking on his onw effluent, is an emotional problem as well as an intellectual problem, the psychological or spiritual weight of his human ecological condition can perhaps be best brought together by the humanities approach. A sensitive team of scientist, social scientist, and humanities teacher has the chance to produce the synthesis needed for survival.

Having come through thought-feeling to the necessity for the synthesis of best abilities to deal with the geometrically increasing attack on the biosphere there is the question of teaching matter requisite to the problem. Since the environmental problems are as multifold as the spectrum, there is a necessity to deal with both global cancers and local cancers. And since most of us relate more exactly to local problems, it seems to this reviewer that the movement to capture a less divided attention from students should begin with the local and, once he is hooked, proceed to the global.

The six units offered in the curriculum all offer projects and studies located in ones own back yard as well as those which are of global scope and this is as it should be since the pesticide that starts in the metropolitan Minneapolis-St. Paul environ becomes part of the subject and object of Silent Spring, the wounded city becomes part of the burgeoning welfare and penal bill, and the limited air, once fouled, can precipitate the waiting cancer. If one cannot deal with his own septic tank, psychological or actual, one cannot deal with the biosphere.

Dealing with the biosphere must start in various ways in various schools. How does one use units on Population, Food Supply, Natural Resources, Air Pollution, Water Pollution, and Human Pollution in Mounds View High School?

A number of ways present themselves. Our humanities classes taught by four teachers, enroll about 100 students each year. We could run a condensed ecology unit by dividing our students into six groups, with student discussion leaders, visiting speakers, etc., and having the six groups spend a week on each theme with a general rap session following the week of small group meetings, and there is something to be said for such a touch and go approach for an intense and prolonged effort can sometimes have the effect of producing a so-what attitude while touch and go can whet both appetite and action.

Another approach would be to set up a semester course with a team from biology, social studies, and English. Tentatively pursuing this thinking I have put copies of the 7-12 curriculum in the hands of interested teachers in these areas.

A third approach for a small school system which might not be able to schedule a team teaching situation is to have a semester course run by a science, social, or English teacher who is capable of the liberal arts synthesis.

In any event there are within this curriculum enough materials in the pertinent areas mentioned so that courses of the length and structure needed can be tailored to

a variety of school situations. It is important to note in this connection that other than the vast amounts of materials available in the curriculum itself, most of the proposed readings are available in inexpensive paperbacks.

Looking at this curriculum from an adverse point of view, this reviewer would have appreciated a central philosophy statement following the overview outline for each unit but perhaps this is nit-picking since the philosophy is implicit in the choice of selections. Over all it is excellent and thorough and capping it all is an Ecology 10 course outline by Dr. Allan Brook which can be used by the teacher in preparing his introductory overview and by the student to clarify and organize the ground he has covered.

Franklin Brainard

Mounds View High School

FACULTY EVALUATION

Name_____

School_____

School enrollment_____

Name of course_____

Unit title_____

1. Overall reaction to unit (0=poor; 10=excellent) _____

2. Do you plan on using this material again? _____

3. Criticisms of unit:

4. Positive reactions to unit:

5. Suggestions as to readings, activities, etc. that you might offer in order to enhance this unit:

Please return to: D. Budde
Highview Junior High School
2300 N.W. 7th Street
New Brighton, Minnesota 55112

FACULTY REACTION

Unit Title_____

The Unit used was. . . . . .

beneficial	:____:____:____:____:____:____:____:	poor
appropriate	:____:____:____:____:____:____:____:	inappropriate
timely	:____:____:____:____:____:____:____:	untimely
feasible	:____:____:____:____:____:____:____:	unfeasible
logical	:____:____:____:____:____:____:____:	illogical
realistic	:____:____:____:____:____:____:____:	unrealistic
organized	:____:____:____:____:____:____:____:	disorganized

The material in this Unit was. . . .

clear	:____:____:____:____:____:____:____:	unclear
understandable	:____:____:____:____:____:____:____:	confusing
meaningful	:____:____:____:____:____:____:____:	meaningless
rigid	:____:____:____:____:____:____:____:	fluid

Generally, my students reacted. . .

interested	:____:____:____:____:____:____:____:	disinterested
enjoyed	:____:____:____:____:____:____:____:	disliked
accepted	:____:____:____:____:____:____:____:	rejected

_____
Reviewer

_____
Subject Grade

_____
Address

DISTRICT ASSESSMENT - Used in March

TO: Junior High Teachers Concerned with Environmental Education

FROM: Bob Carlson

I have been asked to collect information on the following:

1) The use of the Environmental Education materials within your school and your reaction to the materials, and

2) Your interest in further work in the area of Environmental Education.

The results of this survey will be made available to all participating teachers and will be used for direction in future discussions of Environmental Education.

Please complete the following survey and return it to me through the district mail system.

_____ _____

Name School

Please check a response and also comment after each basic question.

1. What are your reactions to the environmental curriculum guide?

a) Is it available to you for use? _____ Yes _____ No

b) Have you used it in a class? _____ Yes _____ No

c) Have you paged through it? _____ Yes _____ No

d) Has it been discussed at any of your building department meetings? _____ Yes _____ No

e) Would you like a workshop on how to utilize the guide? _____ Yes _____ No

f) Is it necessary to revise the guide before you can use it? _____ Yes _____ No

g) Are the students interested in the guide materials? _____ Yes _____ No

COMMENTS:

(over)

COMMENTS (Con't.)

2. Would you be interested in further work in Environmental Education?

a) A workshop with district credit

_____ Yes _____ No _____ Undecided

b) A course with college credit

_____ Yes _____ No _____ Undecided

c) Developing more materials under a funded project with pay

_____ Yes _____ No _____ Undecided

d) Working with teachers from other subject disciplines

_____ Yes _____ No _____ Undecided

e) Do you feel you have spent enough time on environmental education in your classes this year?

_____ Yes _____ No _____ Undecided

f) Are your students interested in studying environmental education

_____ Yes _____ No _____ Undecided

COMMENTS:

FEEDBACK QUESTIONNAIRE

CIRCLE ONE: SA = Strongly Agree A = Agree U = Undecided D = Disagree
SD = Strongly Disagree

SA A U D SD 1. As a result of this workshop, I have more knowledge of the summer writing work.

SA A U D SD 2. Members of the workshop staff communicated their subject.

SA A U D SD 3. Enough time was provided to develop implementation plans.

SA A U D SD 4. Adequate answers were given to questions by the Irondale teachers.

SA A U D SD 5. Adequate answers were given to questions by the Junior High teachers.

SA A U D SD 6. The workshop maintained a reasonable schedule.

SA A U D SD 7. The large group meetings in this workshop were helpful.

SA A U D SD 8. The small group meetings in this workshop were helpful.

SA A U D SD 9. Plans were developed for implementation of the program.

SA A U D SD 10. Generally speaking, this workshop provided me with what I came for.

ADDITIONAL COMMENTS:

Suggested Proposals From The Environmental Site Committee In Regard To Environmental Site Studies

1. The acquisition of land if possible at the following sites to supplement the study areas already in use, some of which presently do not belong to the school district.

    a. Johanna Junior High
    b. Irondale High School
    c. Valentine Hills
    d. Sunnyside, Irondale, Edgewood combination
    e. Ralph R. Reeder
    f. The Wilson Site
    g. North Oaks Site

2. Provide bus transportation to ecological sites for all grade levels (to areas both within and without the district).

3. The maintenance improvement and more rigid control of land usage already belonging to the school district and currently being used for environmental studies.

    a. Establish a log path onton or across the marsh biome west of Mounds View similar to the University of Minnesota's bog-land trail at their arboretum.

    b. The planting of seedlings to establish a tree fence just inside the recently surveyed property line at Mounds View. (Seedlings obtained at not cost.)

    c. Establish guidelines for herbicide spraying and cutting to prevent reoccurrence of past seedling destruction.

    d. Snowmobile and other vehicle control to protect seedlings already planted at Mounds View (and other schools if needed).

    e. Establish a "school forest" of indigenous tree species at all schools and sites.

    f. Obtain financial support for established ecological orientated extra curricular groups, thus providing them with an advisor, transportaion, etc.

    g. Clear definition of property lines at all schools and sites.

4. The appointment of a District Environmental Director to be responsible for:

    a. The development and coordination of all environment programs, sites, curriculum, etc.

    b. Act as curator at the Wilson Site to conduct lectures, guide tours, coordinate and arrange tour schedules, plan and help conduct in-service teaching programs, add to and direct physical maintenance of the area.

    c. The exploration of the possibility for a mobile museum and lab to visit grade schools from the Wilson Site. (Similar to those in the Anoka and Albert Lea Districts.)

    d. Protection of the Wilson Site.

Long Range Wilson Site Proposals

1. Establish well marked nature trails, marking with numbered stakes the location of special interest areas as well as the flora along the trail.

2. Issue guide sheets corresponding to the numbered stakes along each trail telling the scientific name, common name, characteristics, etc.

3. Establish and maintain feeding stations and berry producing bud-food shrubs to increase the indigenous population of birds and mammals.

4. Build, place and maintain bird houses, feeding shelves and trays as well as improving upon (whenever possible) the natural nesting areas.

5. Maintain (if qualified personnel and Federal permit is available) a bird banding station.

6. Use the various habitats as a source of biological materials for classroom study, that could be collected without endangering its primative and ecological values. Examples: algae, aquatic insects, individual specimens of fish and amphibians.

7. Use as an outdoor classroom by all grade levels for their units on zoology, botony, ecology, conservation, ornithology, mammalogy, etc.; assistance, tours and lectures being conducted by district personnel.

8. Establish a biological-ecological museum in the classroom, containing mammal study skins, skulls, bird study skins, herberiim, etc. of indigenous species of the state.

9. Conduct in-service teaching programs with the cooperation of local colleges, granting college credit for all interested residents and teachers in the school district.

10. Possible site for small group of indigenous animals that may be in the immediate area, but not always available for viewing by a class of thirty students. (Zoo)

11. Conduct more extensive summer sessions for small groups of interested students in the field of ecology and conservation.

12. Through the years, increase by planting, the number of flora species in all habitat types.

13. Establish possible restricted camping sites (providing the village would allow this).

14. Lay out and maintain cross-country skiing and touring trails.

15. Acquisition of three dozen pairs of snowshoes plus the development and maintenance of trails for their use.

16. Establish a nursery to provide landscape materials for buildings in the district.

Harry Van Hoose
School Board Presentation
Turtle Lake School
January 18, 1971